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**DOUBLE ACTION, HAMMER TRIGGER MECHANISM FOR A FIREARM**

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**DOUBLE ACTION, HAMMER TRIGGER MECHANISM  
FOR A FIREARM**

**Cross Reference to Related Applications**

[0001] This application claims the benefits of prior filed, co-pending U.S. provisional patent application Serial No. 60/416,030 filed on October 3, 2002.

**Technical Field**

[0002] This invention relates to an improved double action, hammer trigger mechanism for a firearm. More particularly, it relates to an improved mechanism for releasing the hammer when the trigger operates a known type of transfer bar operating means to either release the hammer at a single action let-off position, or to draw back the hammer and release it when the trigger is pulled to a double action let-off position.

**Background Art**

[0003] A firearm, and in particular an autoloading or automatic firearm, is equipped with an external hammer that can be cocked to the rear and engaged with a sear and then tripped by squeezing the trigger which engages the sear by means of linkage releasing its engagement to the hammer (single action let-off). Alternatively, the hammer can be drawn to the rear for release and firing by squeezing the trigger without first cocking the hammer. This is accomplished through the linkage system engaging the hammer with the trigger for the aforementioned purpose; pulling the hammer rearward and releasing it before it can be engaged by the sear (double action let-off).

[0004] This invention relates to firearms functioning in the aforementioned manner incorporating a hammer spring, usually located in an area behind the magazine well in the frame and consisting of various components to accomplish the single action and double action let-offs. Historically, it is not recommended that anyone but an accomplished gunsmith work on these mechanisms as they are complicated and improper assembly or disassembly is very likely to occur. The invention addresses these issues by accomplishing the same objectives but with basic components that anyone with an aptitude for mechanics can easily understand.

[0005] Accordingly, one object of the present invention is to provide a simplified double action, hammer trigger mechanism for a firearm.

[0006] Another object of the invention is to provide an improved single action mechanism for releasing a sear engagement with a cocked hammer using a transfer bar connected to the trigger.

[0007] Another object of the invention is to provide an improved double action let-off mechanism using a transfer bar connected to the trigger for pulling back and releasing the hammer before the sear engages the hammer.

[0008] Still another object of the invention is to provide an improved hammer trigger mechanism suitable for an automatic or semi-automatic firearm of the type having a slide operated with a recoil spring for automatic or semi-automatic firing.

### **Disclosure of Invention**

[0009] An improved double action, hammer trigger mechanism for a firearm of the type having a frame, a barrel for receiving a cartridge, a slide or bolt arranged to move longitudinally between a forward and a rearward position with respect to the barrel, the slide or bolt defining a cam surface, a firing pin longitudinally slidable in the slide or bolt so as to strike the cartridge, a hammer arranged to pivot about a first pivot point on the frame, the hammer defining a sear notch, spring biasing means urging the hammer toward the firing pin, a spring-loaded sear arranged to pivot about a second pivot point on the frame, the sear including a lip for cooperating with the sear notch to hold the hammer cocked when the hammer is pivoted, a trigger arranged to pivot about a third pivot point on the frame, the trigger having a trigger pivot pin thereon which is disposed so as to move in a forward direction when the trigger is pulled, a transfer bar having a first end connected to the trigger pivot pin, the transfer bar including a first finger cooperating with the cam surface when the slide is in a forward position, and a transfer spring biasing the first finger toward the cam surface, the improvement comprising a single action let-off pin disposed on the sear, the transfer bar further including a second finger arranged to engage the single action let-off pin and pivot the sear when the trigger is pulled so as to release the hammer when the sear is holding the hammer cocked, a double action let-off pin disposed on the hammer, the transfer bar defining a notch disposed to receive the double action let-off pin to cause the transfer bar to pivot the hammer in a cocking direction against the spring biasing means when the trigger is pulled to an intermediate position, the transfer bar first finger cooperating with the slide cam surface to move the transfer bar notch away from the let-off pin to release the hammer when the trigger is pulled to a double action let-off position.

### **Brief Description of Drawings**

[0010] The invention will be better understood by reference to the following description, taken in connection with the accompanying drawings, in which:

[0011] Fig. 1 is a side elevational drawing, partly in section, of a semi-automatic firearm,

[0012] Fig. 2 is a stylized side elevational drawing of the uncocked hammer trigger mechanism,

[0013] Fig. 2a is an enlarged view of a portion of the mechanism of Fig. 2,

[0014] Fig. 3 is a side elevational drawing of the trigger mechanism according to Fig. 2, but with the hammer cocked for single action let-off,

[0015] Fig. 4 is a simplified drawing of the major components of the trigger mechanism commencing double action hammer rotation,

[0016] Fig. 5 is a side elevational drawing of the same mechanism at a later stage of double action movement, and

[0017] Fig. 6 is a side elevational view of the mechanism at the double action let-off position.

### **Best Mode for Carrying Out the Invention**

[0018] Referring now to Fig. 1 of the drawing, the invention is described as embodied in a semi-automatic firearm of the type using a spring-loaded cartridge magazine (not shown) and having a reciprocating slide 12 adapted to move from a forward position in a rearward direction against a recoil spring (not shown) when a cartridge 14 is fired. During the rearward movement, the shell of cartridge 14 is ejected, and during the return forward movement, a new cartridge is stripped from the magazine and inserted into the bore of a barrel 16 in a manner well known in the art. Slide 12 is reciprocable in tracks upon a frame 18. A hammer 20 is pivotably mounted on frame 18 to strike a firing pin 22, which is longitudinally slidable in the slide 12 so as to strike the rear of cartridge 14. A trigger 24 is pivotably mounted in the frame and connected to push or pull a transfer bar 26. Slide 12 includes a cam surface 28, which cooperates with a first finger 30 to raise or lower the end of transfer bar 26 when the transfer bar is pushed or pulled longitudinally by the trigger 24. The foregoing list of elements describes a construction known in the prior art. The invention relates to improvements in the linkages in the vicinity of arrow A, as illustrated in the following figures.

[0019] Referring to Fig. 2 of the drawing, the hammer trigger mechanism is illustrated at 0° of trigger rotation and 0° of hammer rotation. Transfer bar 26 is biased upwardly by a transfer spring 32 of a suitable type located in a magazine well 34. Hammer 20 is arranged to pivot about a pin defining a first pivot point 36 on the frame. The hammer defines a sear notch 38 and is spring biased by a known type of spring biasing arrangement having a spring 40 compressed in a hammer spring well 42 by a hammer spring compression pin 44.

[0020] A spring-loaded sear 46 is arranged to pivot about a pin defining a second pivot point 48 against a compression spring located in a sear spring well 50. A spring-loaded sear is well known and the spring is not illustrated in order not to obscure the details of the invention.

[0021] The trigger 24 is arranged to pivot about a pin defining a third pivot point 52 on the frame, and is pivotably connected to transfer bar 26 by a trigger pivot pin 54. When the trigger 24 is pulled, the trigger pivot pin pulls the transfer bar 26 in a forward direction.

[0022] In accordance with the present invention, sear 46 is equipped with a single action let-off pin 56, and hammer 20 is equipped with a double action let-off pin 58. These are so disposed and arranged to cooperate with a notch 60 and a second finger 62, respectively on the transfer bar 26 (see Fig. 2a).

[0023] Reference to the enlarged scale drawing of Fig. 2a, it is seen that the end of transfer bar 26 defines notch 60 disposed to receive the double action let-off pin 58. Further, the transfer bar 26 defines a second finger 62, which is arranged to engage the single action let-off pin and pivot the sear when the trigger is pulled.

[0024] Referring to Fig. 3 of the drawing, the hammer trigger mechanism is shown for 49.5° of trigger rotation and 60° of hammer rotation. Hammer 20 is shown cocked for single action let-off, and is being held in place by sear 46. Trigger 24 has been pulled, causing transfer bar 26 to be pulled forwardly and downwardly as dictated by the cam surface 28. The second finger 62 on the transfer bar is so positioned and dimensioned to engage the single action let-off pin 56. This causes sear 46 to pivot and release hammer 20 to strike firing pin 22.

[0025] Figs. 4 through 6 illustrate the double action let-off sequence. Referring to Fig. 4 of the drawing, the hammer trigger mechanism is shown at 30° of trigger rotation and 34.2° of hammer rotation. As trigger 24 is pulled, the first finger 30 begins to force transfer bar 26 in a downward direction against transfer spring 32, as transfer bar 26 moves forward. The notch 60 in the transfer bar engages the double

action let-off pin 58 and is starting to cock hammer 20 against the compression spring 40 in hammer spring well 42.

[0026] Referring to Fig. 5 of the drawing, trigger 24 has been drawn to a 40° rotation position to further rotate the hammer to a 35° position against spring 40. Cam surface 28 continues to move in a downward direction against transfer spring 32. This moves notch 60 in a direction away from the double action let-off pin 58.

[0027] Finally, referring to Fig. 6 of the drawing at double action let-off position, the trigger has been pulled to 55° trigger rotation, and the hammer to 49.2° hammer rotation. The sear has not yet engaged the hammer to hold it in a cocked position (Fig. 3). The first finger 30 has lowered transfer bar 26 to the point where notch 60 no longer holds the double action let-off pin 58. This releases hammer 20 to strike firing pin 22.

[0028] The invention has been described for a semi-automatic firearm with a recoil slide and the cam surface disposed in the slide when the slide is in the forward position. The invention is equally applicable to a firearm with a bolt instead of a slide mechanism. In this case, the bolt is closed to hold the cartridge in the chamber. When the bolt is at the forward position, a cam surface similar to cam surface 28 is so disposed in the bolt to cooperate with a transfer bar. The modification of the invention to apply to a firearm with a bolt will be readily understood by one skilled in the art.

[0029] While there has been described what is considered to be the preferred embodiment of the invention, other modifications will occur to those skilled in the art. It is desired to secure all such modifications as fall within the true spirit and scope of the invention.